

IN THE CLAIMS:

Claims 1-6 (cancelled).

7. (previously amended) An INS/GPS receiver including:

- A. an antenna for receiving signals from a plurality of GPS satellites;
- B. a GPS sub-system for
acquiring and tracking the signals from the respective GPS satellites in
view,
determining GPS position and related covariance information, and
producing associated delta phase measurements that are double differ-
enced across both time and the GPS satellites;
- C. an inertial measurement unit for making measurements associated with
the acceleration and relative orientation of the receiver;
- D. an INS Kalman filter that uses the inertial measurements and the delta
phase measurements to update and maintain current and previous position related
information and propagate current position, velocity and attitude related informa-
tion; and
- E. a mechanization task that determines inertial position, velocity and atti-
tude based on the inertial measurements and the updated information pro-
duced by the INS Kalman filter.

8. (original) The receiver of claim 7 further including

a distance measurement unit that provides a measurement that is associated with
the distance traveled over a measurement interval; and

the INS Kalman filter further calculates an along track difference based on the
measurement made by the distance measurement unit and a trajectory that is based on
the inertial measurements over the same interval, the INS Kalman filter using the
along track difference to update previous and current position related information and

propagate current position, velocity and attitude.

9. cancelled

10. cancelled

11. (previously amended) A method of determining inertial position using an INS Kalman filter, the method including the steps of:

- A. receiving from a GPS sub-system GPS position, covariance information and GPS observables that over time measure position change;
- B. making acceleration and attitude related inertial measurements;
- C. using the observable and inertial measurements to update and maintain position information relating to a current position and a previous position and using the inertial measurements and the updated information to propagate current position, velocity and attitude related information; and
- D. using the propagated current position related information to determine an inertial position.

12. (currently amended) The method of claim 11 wherein the GPS observable is A method of determining inertial position using an INS Kalman filter, the method including the steps of:

- A. receiving from a GPS sub-system GPS position, covariance information and GPS observables of carrier phase that is double differenced over both time and GPS satellites that over time measure position change;
- B. making acceleration and attitude related inertial measurements;
- C. using the observable and inertial measurements to update and maintain position information relating to a current position and a previous position and using the inertial measurements and the updated information to propagate current position, velocity and attitude related information; and
- D. using the propagated current position related information to determine an

inertial position.

13. (currently amended) The method of claim 11 further including
making measurements and determining other GPS observables and non-GPS ob-
servables that over time measure position change; and
including the other GPS observables and the non-GPS observables in the updating
of previous and current position information.
14. (currently amended) The method of claim 13 wherein the ~~other~~ non-GPS observable
is wheel revolutions.